WHEN TRUST MATTERS

Floating Offshore Wind Supply Chain – Overview

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INTRODUCTION to FLOATING OFFSHORE WIND FARMS

Significance of floating offshore wind technology:

- **Unlocks access to deeper waters and stronger winds**
- **Growing relevance to U.S. Energy Strategy**

Key components of FOW farms

East Coast OSW experience

Options for manufacturing, installing, operating FOW farms

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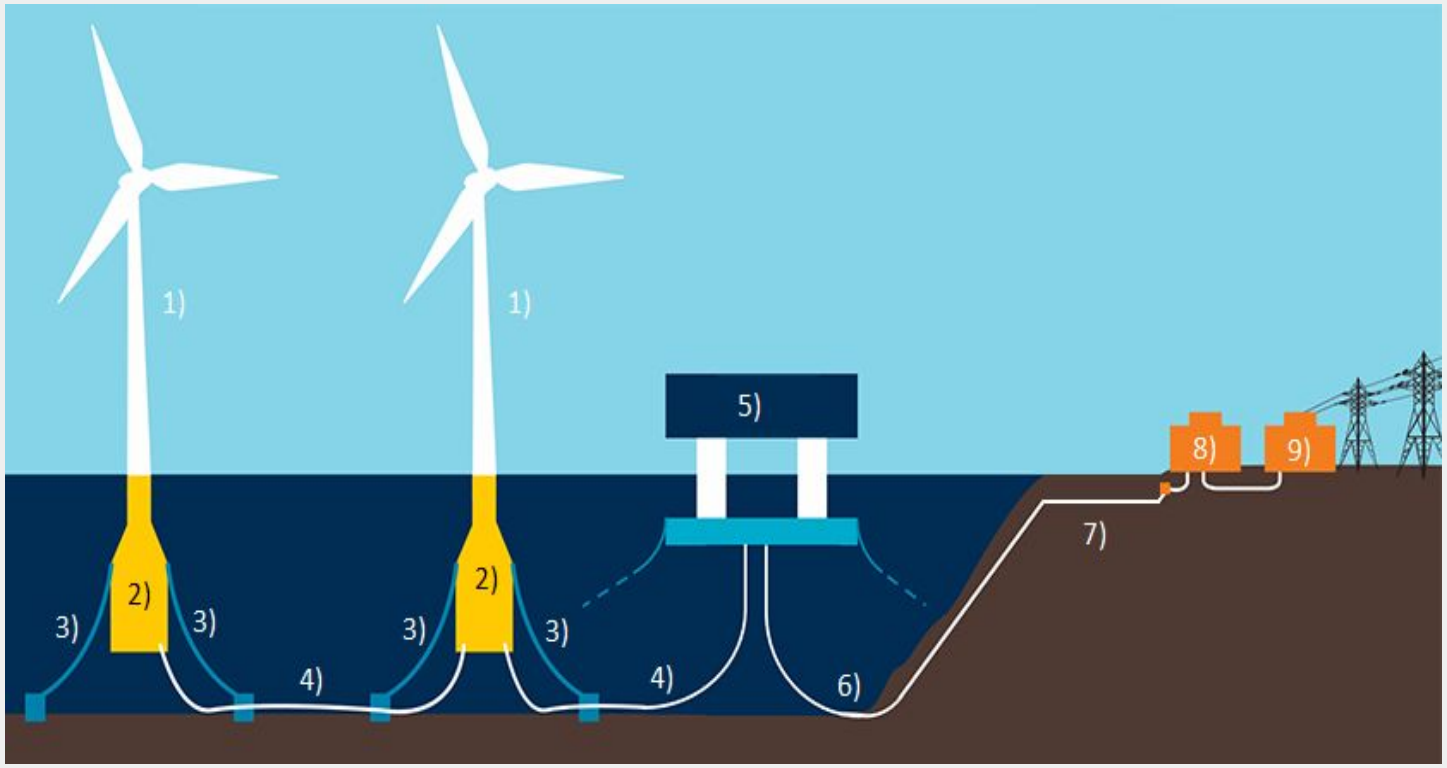
Key Components of Floating Offshore Wind Farms



- Turbine (blades, nacelle, tower)
- Foundation & Mooring system
- Inter-array cable
- Offshore substation
- HVDC converter
- Offshore & onshore export cables
- Onshore substation, grid connection

1) Turbines	2) Foundations	3) Mooring system			4) Array Cable	5) Offshore Substation			6) Offshore export Cable	7) Onshore export cable	8) Onshore substation	9) Grid interconnection upgrade works
		Mooring Chain	Connectors	Anchors		Structure	Topside	Equipment				

*Each color potentially represents a different supplier

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OSW supply chain development on the East Coast

- **Rapid growth and investment**
  - Driven by increasing state and federal support (ORECs, PPAs, IRA)
  - Investments in port infrastructure, manufacturing facilities, workforce development
- **Development of local supply chain**
  - Announced or under development: Blades, Nacelles, Towers, TPs, Monopiles (2), Secondary steel (2), cables (3), offshore substations
  - Fostering economic growth in local communities along East Coast and in Gulf of Mexico
- **Collaboration with European experts**
  - Leverage EU experience and expertise to accelerate US OSW industry,
- **Workforce training programs**
  - Need for skilled labor – states developing training programs; partnering with academic institutions
- **Challenges and bottlenecks**
  - Jones Act, inflation, logistical hurdles transporting large components, complex regulatory environment

East Coast OSW supply chain lessons learned

- **Early engagement with suppliers**
  - Important to understand and mitigate potential SC bottlenecks
  - Anticipate challenges related to component availability, logistics, manufacturing capacity
- **Diversification of supply chain sources** – at least 2 suppliers for each major component
  - Reduces risks associated with supply disruptions, political uncertainties, market fluctuations
- **Local supply chain development**
  - Reduces logistics complexities & costs, fosters economic growth, mitigates global market dependencies
- **Adaptability and flexibility in planning** – disruptions can happen
  - Contingency plans & ability to adjust timelines in response to SC challenges
- **Collaboration with regulatory bodies and stakeholders**
  - Essential to navigating permitting processes, enviro regulations, community concerns
  - Clear comms with Tribal leaders, Local communities, Environmental groups, Fishing industries can facilitate smoother SC operations

What is the manufacturing potential in the NW?

- **Wind turbines**
  - NW has advanced manufacturing capabilities in aerospace and tech sectors
  - Blades, nacelles, towers
- **“Balance of plant” infrastructure**
  - NW has a strong maritime & ship-building industry
  - Floating foundations
  - Floating electrical substations and HVDC converter stations
  - Mooring systems and anchors
- **Subsea cables**
  - Dynamic inter-array cables, Lazy-wave export cables
- **R&D** – NW is KNOWN for innovation hubs, research institutions
  - Ideal for developing and fabricating advanced components, new materials for corrosion resistance, advanced sensors for monitoring, ROVs/AUVs and drones for remote maintenance

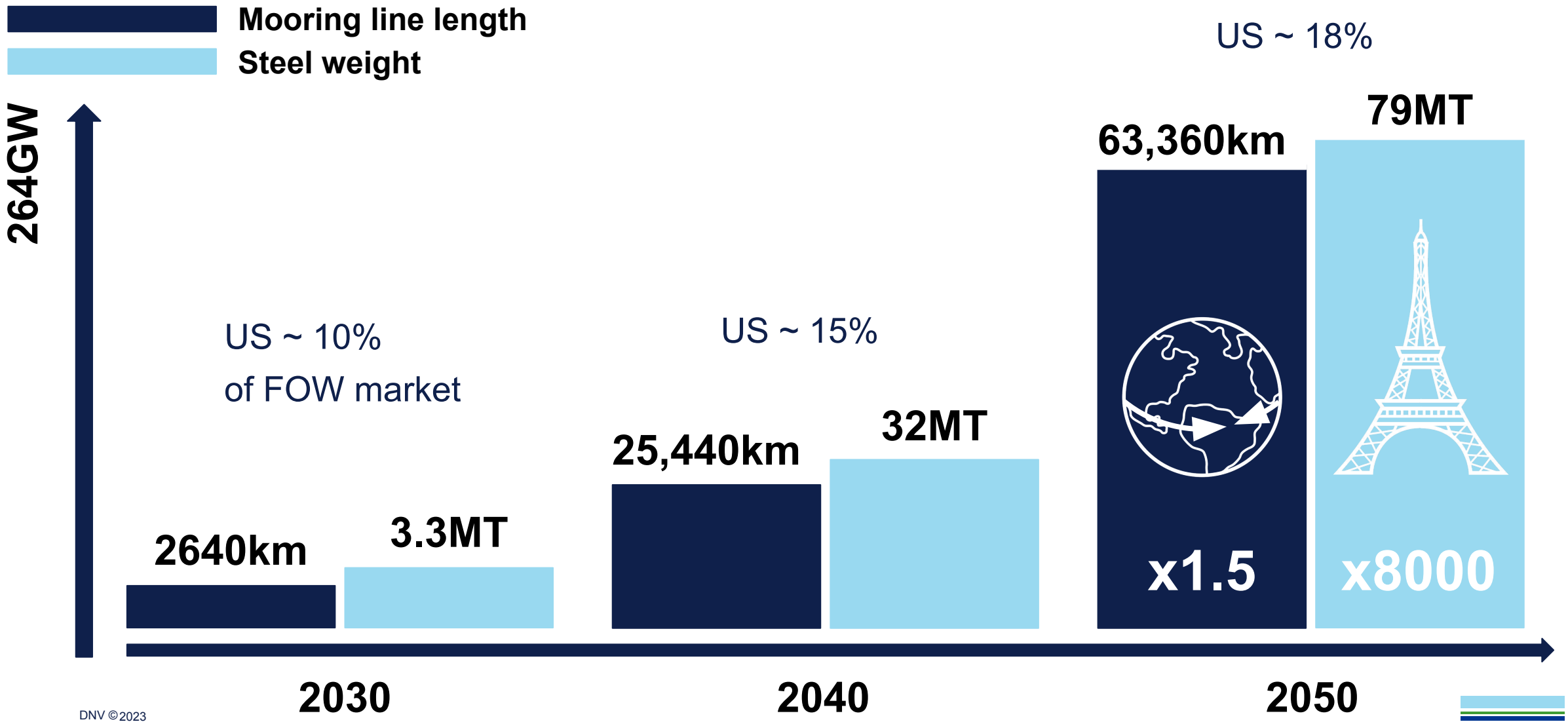
FOW farm installation processes and strategies

- **Importance of port infrastructure and coastal facility upgrades**
  - Upgrades to accommodate large components, assembly areas, cranes
  - Quayside assembly of the FOWTs prior to tow-out
- **Specialized vessel requirements: transportation and installation**
  - Jones Act compliant vessels: long haul tugs, anchor handling vessels, CLVs
- **Deepwater installation challenges: logistics and engineering solutions**
  - Variable ocean conditions and seabed profiles
  - Complex logistical planning (e.g., dynamic cable installation)
- **Coordination with maritime and environmental agencies**
  - Regulatory compliance – maritime regulations, safety standards, environmental protection laws
  - EIAs to mitigate potential impacts on marine ecosystems
  - Coordination with maritime, Tribes, environmental agencies, fishing industry, local communities

Operational management and maintenance

- **Unique aspects of FOW farm operations vs fixed-bottom OSW farms**
  - Deeper waters, mooring lines, dynamic cables, and an overall more dynamic system demands more sophisticated management of operations
- **Remote monitoring and automated maintenance technologies**
  - Advanced monitoring tech to track performance, weather, equipment status
  - Drones, robots, ROV/AUVs revolutionizing maintenance operations, improving safety, reducing cost
- **Strategies for minimizing environmental impact**
  - Planning maintenance campaigns to avoid sensitive periods for marine wildlife
  - Ongoing environmental monitoring to assess impact and adjust operations as needed
- **Grid integration and energy storage solutions**
  - including battery storage systems to optimize distribution of electricity from offshore wind
- **Workforce development and training programs**

Floaters – major supply chain challenge/opportunity



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Thank you

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